## V.—A Description of the Big Diamond recently found in the Premier Mine, Transvaal.

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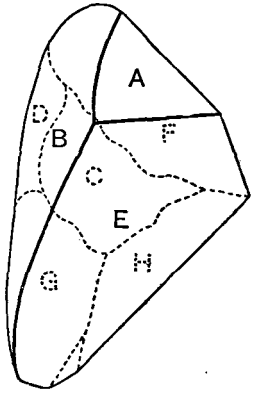
(PLATES VII AND VIII.)

GREAT interest has been excited, not only in the Transvaal, but throughout the world, by the discovery at the Premier Mine, on Wednesday, the 25th January, 1905, of the largest diamond hitherto known. The stone was found by Mr. Wells, Surface Manager, in the yellow ground about 18 feet from the surface, a brilliant flash of light from a projecting corner having caught his attention. After a preliminary cleaning it weighs 3,024¾ carats. According to Gardner Williams the South African carat is equivalent to 3·174 grains; consequently the diamond weighs 9600·5 grains troy or 1·37 lbs. avoirdupois. Through the courtesy of the Directors of the Company, we have been enabled to make an examination of the stone, with the following result:—Roughly speaking, it measures 4 by 2½ by 2 inches; but its size and shape will be best realized by




Diagrammatic Projection (to half scale).

reference to the photographs reproduced on Plates VII and VIII, which represent the diamond from four different points of view and its actual size. These beautiful photographs were taken by Mr. E. H. V. Melvill for the purposes of this description. The stone is bounded by eight surfaces, four of which are faces of the original crystal, and will be referred to in this description under the letters A, B, C, D, and four are cleavage surfaces, the cleavage being of course parallel to the face of the octahedron. In the following description these cleavage surfaces are referred to under the letters E, F, G, H. They are distinguished from the original octahedral faces by greater regularity and smoothness. The shape and relative position of these various surfaces can be seen in the diagrammatic

projection depicted in the Text-figure, which has been drawn in the Mineralogical Laboratory of the Oxford University Museum, by the kind permission of Prof. Miers, F.R.S. The drawing is to half scale.

*Description of the Surfaces.*

A is an original octahedral face showing typical striations, the bands varying from 0·1 to 0·4 centimetre, and running parallel to the edge A–E.

B is a large surface slightly curved showing partial striations, which, however, are interrupted by the slightly mammillary character of the surface.

C is also a natural surface showing a few striations parallel to the edge C–E.

D. Between B and F, C, G, there is an irregular octahedral face D, showing distinct equilateral triangular indentations which resemble etched figures, except in regard to their comparatively large size, the largest having a side measuring 0·7 centimetre. D is parallel to E.

E, F, G, H, are cleavage planes.

E is the largest of these, and is a very perfect cleavage plane. Parallel to it within the crystal there is a small air layer between two internal cleavages, producing a 'rainbow' or Newton's rings.

F is the second largest of the cleavage planes and shows a small spot within the crystal.

G is an irregularly shaped cleavage plane.

H is another cleavage face showing series of cleavages in the corner bounded by E and G. Two spots are visible, one actually on the surface, the other about 1 cm. within the crystal.

Of the faces given, A and G, H and B, and E and D are parallel. In the case of B and H the parallelism is imperfect owing to the curvature of B.

The purity of the crystal is best seen on looking into face E, and the lustre is well seen on the irregular natural face B, the broken cleavage on H causing a good deal of refraction which affects B to some extent as the facets of a cut gem would. For a large stone the crystal is of remarkable purity, and the colour approximates to that of a blue-white.

The large size of the cleavage planes E and F indicates that a very considerable portion of the crystal is wanting. From the shape of B, D, and G, one can say that the entire crystal was irregular in shape, but A and D being octahedral faces, the presumption is that the complete crystal was a distorted octahedron, probably with dodecahedral faces developed on the edges. The portions missing probably amount to more than half of the original crystal.

The Cullinan diamond, as it has been named, after the Chairman of the Premier Company, is more than three times the weight of the largest diamond previously known—the famous stone found in 1893 at Jagersfontein in the Orange River Colony, which weighed 972 carats.

## EXPLANATION OF PLATES.

### Plate VII.

Fig. 1 shows the original face A at the top of the stone. In front is the cleavage plane E, which, however, is not clearly visible owing to the light reflected from the somewhat irregular surfaces at the back of the crystal. On the extreme right is the cleavage plane H.

Fig. 2 shows the cleavage plane F, which, on account of its favourable position relative to the camera, appears as a brilliantly illuminated surface; the irregular original faces C and D also appear in this view.

### Plate VIII.

Fig. 3 shows the triangular indentations on the irregular face D; also portions of A and B.

Fig. 4 shows the crystal resting on the cleavage plane E with the faces B and D exposed to view. The sharp bounding edges are formed as follows: at the bottom by E, on the right by A, and on the left by G.

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## VI.—The Classification of the Phacopidæ.

By F. R. Cowper Reed, M.A., F.G.S., of the Sedgwick Museum, Cambridge.

THE family of Trilobites termed Phacopidæ has been defined by Beecher[1] as follows:—"Glabella tumid, widest in front. Free cheeks continuous, united anteriorly. Suture extending from in front of the genal angles inward to the eyes, and thence forward around the glabella. Eyes generally large, always with distinct facets, schizochroal. Thorax of eleven segments with grooved pleura. Pygidium usually large and of many segments; limb ribbed; margin entire or dentate."

### *Nomenclature in use.*

While the general limits and characteristics of the family as thus given are universally recognised, much confusion and diversity of opinion still exist as to the generic groups which must be therein included. There is no precise agreement in the usage of many of the common generic names; and many subgenera have been from time to time established without general acceptance. Some palæontologists (e.g. Salter) have been of the opinion that the family only contained one genus, *Phacops*, which might be split up into several subgenera. Barrande, however, recognised the presence of two genera, *Phacops* (in a more restricted sense than Salter) and *Dalmania* or *Dalmanites*; and Hall & Clarke in 1888[2] adopted this view. Beecher in 1900 (op. cit.) mentioned six divisions or groups within the limits of the family, and put them all as of equal generic value.

Other examples of differences in the classification of the family need not here be given; but in order to show the multitude of generic or subgeneric groups which have been established, but of which only a few have been generally adopted, the following list

[1] Beecher, Amer. Journ. Sci., vol. iii (1897), p. 202; and in Zittel's "Textbook of Palæontology" (English translation, 1900), p. 636.

[2] Hall & Clarke: Palæont. New York, vol. vii, pp. xxvii–xxxii.


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